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RIVAL ROUTES FROM THE WEST.

An Extract from the Report of Alexander Berkley, Canal Commissioner of the State of New York, March, 1875.

INCREASED CARRYING FACILITIES—CHAMPLAIN SHIP CANAL.

The immense productions of the great west and north west are largely in excess of all existing means of conveyance to tide water, and the constantly increasing yield of this rapidly developing region will render them daily more insufficient to meet the ever growing wants of a trade and commerce, whose magnitude and colossal proportions dwarf the foreign commerce of the country into insignificance.

The necessity, therefore, of making adequate provision for their transportation is apparent, and the question is one of vital importance to the people of this state, whose past prosperity is due to the control of this great business and whose future is so largely dependent upon it.

It is exciting the attention of the general government and of all the great states interested, and the past year a United States Senate Committee, composed of its ablest and leading members, visited in person all the proposed routes, and collected a mass of evidence and statistics in relation to this matter, of great value, which are embodied in two large volumes published by the present Congress, and to which I shall have occasion to refer.

The need of enlarged facilities is conceded—the mode is yet undetermined, but its decision will be speedy, and while there is yet time the people of this great state should be awake to a sense of the imminence of the danger threatening them of losing the internal trade, which carries with it of necessity the external commerce of the country,

and providing suitable facilities, avert the calamity.

The empire state gained her proud cognomen from the wisdom and foresight of the great statesmen who were early in her history called to the helm of state to guide her destinies, and the great canal system which was the result of their broad and enlarged conceptions and capabilities of this great country, and the proper mode of their development, had scarcely been put in operation, before she assumed that leading and commanding position in the great family of states that she has since maintained, and thus controlling the trade of the state and nation, New York City became the great metropolis and financial centre, not only of the state, but of the nation and continent.

A few years later [1835], when the wonderful increase of business, engendered by the rapid peopling of the west and its immense productiveness, rendered the great channel thus provided insufficient for the work of transporting the products of the growing west to the market, the persons to whom were entrusted the control of the state, showed equal sagacity, and proved themselves equal to the emergency by inaugurating the enlargement of the Erie Canal, which delayed and embarrassed by its enemies, was not completed until 1862. These wise and statesmen-like measures were effectual for a long series of years, but the completion of the great Canadian system of canals with corresponding river improvements, and also the wonderful ex-

tension of the railroads, commencing about 1850, and culminating in the formation of great trunk lines, have opened new routes which have been gradually and insidiously diverting trade and commerce from their old accustomed channels to routes both north and south of us, until now this diversion has assumed such alarming proportions as to seriously menace the prosperity and future welfare of the state. The seriousness of the danger of this diversion is shown by the fact that while there is positive insufficiency of means of transit, the Erie canal is not taxed to the utmost of its present capacity for various reasons, chief among which, is the length of time required in the present system of towage by horse power, and which it is to be hoped, the introduction of steam on the canal may speedily obviate.

New York city, relying on its great natural advantages, has supinely laid back while its great rivals, Boston, Philadelphia, Baltimore and Montreal, have made gigantic and herculean efforts to draw away this immense business which has enriched and built up this great state and its great seaport. An insignificant portion of the amount expended by Boston or Philadelphia for the purpose of attracting and securing this great western traffic, would suffice to construct the proposed enlargement of the Erie and the Oswego canal, and the Champlain ship canal, works which are absolutely necessary to the maintenance by the great empire state of its present pre-eminence in the national family of states.

The value of these artificial channels of commerce can hardly be over-estimated, especially as they are the only competitors of the railroads, and did they accomplish no other good than that of keeping the prices of freight at low figures, their value would be inestimable. In the hands of the state, no railroads or corporations can combine with them, and unchecked raise the cost of transport to prices ruinous to the producer and oppressive to the consumer. The fallacy of the idea that canals have been entirely superseded by railroads, has been so ably shown by writers of acknowledged ability, that I shall not dwell upon it. But if

we do not furnish all the requisite facilities by constructing canals adapted to the exigencies of the business to be performed, we must not charge consequences which are the result of criminal stupidity to a system which has not been fairly tested. Demand always causes supply, and we may be certain that all necessary facilities will be provided in some direction. Will the people of this State prove themselves equal to the emergency, or will they see this traffic, so essential to their prosperity, borne away from them by their more energetic neighbours? And once lost, these great advantages can never be regained. While it is true that the laws of commerce always gravitate towards great money centres, yet it should be borne in mind that where obstacles interfere to check this current, new money centres will be established to meet the wants of the commercial world. And let this existing channel of trade be once forsaken, and the new money centres firmly established necessary for the controlling and handling this trade, and all efforts to win it back will be futile. The energy, force and business prescience which shall successfully divert it, will be able to keep it, and laugh at our feeble efforts to regain the prize which we shall have so foolishly allowed to slip from our fingers.

As pertinent to these views, and showing the present state of the carrying trade, and the danger of its diversion as well as the extent to which it has been already diverted, I will quote the following extract from a report prepared for and adopted by the Buffalo board of trade, December 18, 1874:

"Between 1866 and 1873, the receipts of grain at Boston have more than doubled, having increased from 4,147,752 to 8,468,658 bushels; those of grain and flour at Montreal have also nearly doubled, having increased from 10,394,454 to 19,713,529 bushels; at Philadelphia they have multiplied nearly four fold, or from 7,260,515 to 24,949,157 bushels; at Baltimore they have more than doubled, the increase being from 8,197,130 to 19,099,717 bushels, and the extension of the Baltimore & Ohio road to Chicago indicates that the future trade of Baltimore will increase as rapidly as

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"that of Philadelphia; but during the same time the receipts at New York have only increased from 57,809,105 to 90,781,523."

"In other words, while the aggregate receipts of grain, etc., at the four competing ports of Montreal, Boston, Philadelphia and Baltimore, have increased in seven years from 29,999,851 to 72,231,061, and are nearly two and a half times as large as they were at the beginning of that time, those of New York have increased only one-half. The receipts of grain and flour in the four rival routes have increased five times as rapidly as those of New York."

"While the receipts of grain at New York, a sure indication of the tendency of all the rest of her trade, have thus fallen enormously behind those of all her rivals, the transit of the cereals by canal has suffered yet more severely. It is even less than it was in 1866. The aggregate of the total movement of the cereals on all the canals in that year was 1,680,169 tons; in 1873 it was reduced to 1,660,981. (See Auditor's report on tolls, trade and tonnage for 1873, p. 403.) In the intervening period it had decreased to 1,189,267 tons, and owes even its present condition to the reduction which has already been made in tolls. During the season lately closed the canal was in a condition never before surpassed, and boats were enabled to make an unusual number of trips; lake and canal freights were unprecedentedly low; and the receipts of grain at the leading upper lake ports were almost exactly the same as in 1873; but the exports from Buffalo by canal were 9,484,786 bushels less than last year."

The above terse and concise statement shows the extent of the diversion already made and the pressing need that exists for immediate action in the premises. The remedy proposed by the Board of Trade (reduction of the tolls), is merely one of those palliatives of a great evil which would be found utterly inefficacious to accomplish the desired result.

It is an undisputed fact then that production is greatly in excess of the means of transportation, and therefore the only question to be considered is

how to obviate it. For myself I can honestly avow that I am sincerely in favor of all the measures which may be devised for the relief of the great agricultural interests of the country, without any jealousy of contending routes or any local feeling beyond that of desiring that New York shall furnish the solution of the problem and retain the control of this immense commerce and derive the great benefits flowing from it.

The great question then is, what route will furnish the greatest relief and afford the greatest facilities for transportation. I believe the Champlain ship canal route can do so, and that it has every possible argument in its favor, and meets every requirement. It can be constructed at less than one-third of the cost of any of its rivals (I do not use this word in an invidious sense) and in less than one-third of the time required for the construction of any other route. And when so constructed, notwithstanding the great distance to be traversed on this route, I am satisfied, that owing to the very few miles of canal navigation (not one-third of that of the most favorable competing route) and the broad and unobstructed waterways of the great lakes and rivers, much less time will be required to transport freight from any point on the great lakes to New York, than by any other water communication.

This route would seem, therefore, to meet all the requirements, cheapness of construction, greater rapidity of transit and lowest rates of transportation, and has the great additional advantage that it could be constructed and in full tide of successful operation years before any other route could be completed, and when so completed, would be of immensely greater size, and practically of capacity without limitation because it is a lake and river route with only a few small and short stretches of canal and those of large dimensions.

The first matter in considering the practicability of a route is, of course, the physical features of the country it is designed to traverse.

Now, with regard to the topography of the country, no one who has examined the subject can fail to be impressed with the conviction that nature has

provided this route through the great chain of lakes, the St. Lawrence, Lake Champlain and the Hudson river—the only break in the continuity of the line, being from Wood creek, the inlet of Lake Champlain to the Hudson at the point where it can be made navigable, at Fort Edward, an actual distance of 17 miles (including Wood creek which is 10 to 15 feet in depth), 24 miles on the route as surveyed. The Hudson river here is 124 feet above tide-water only and Lake Champlain 96, a difference of only 28 feet. Though, as the canal can be constructed more cheaply by maintaining the summit level at 135 feet, the engineers having adopted that line and this would make the distance between the levels 39 feet.

The slight difference in level between the waters so to be connected and the existence of this valley, which is really a break in one of the great mountain ranges of the country, seems to be a provision of beneficent nature for this very purpose. It is a great natural route and there are consequently no obstacles requiring great engineering ability to overcome, no extraordinary or vastly expensive structures which from their cost would render the undertaking impracticable. But the simple preparation of a water-way, as easily prepared as a ditch, with an unfailing and superabundant supply of water from the Hudson itself and the feeders already built, and the cost of which will be small in comparison with the other routes, and in comparison with the original canals constructed in this state. And with regard to this route can be truly said what cannot be said of any other proposed or possible route, that is, that size is of no consequence or rather no embarrassment—for the proposed canal can be constructed of *any* size required—large enough to float any class of vessels and with an unfailing supply of water right at hand and, in fact, almost available at the present writing.

That there is no natural obstacle in this route is so plain that it cannot be controverted, and it is equally indisputable that a supply of water greatly in excess of all possible requirements is immediately accessible and available without any extraordinary expenditure or indeed any expenditure at all, ex-

cept such as to fit existing feeders and channels to the changed line of the new work and bring the great and main feeders down to the proper summit level at 135 feet above tide-water instead of raising the canal through a long level to meet the feeder as the present Champlain canal does.

All the requirements then of a ship canal are therefore seen to be provided by this route. Not *one* of them can ever be fulfilled on the other route. The construction of a *ship* canal on the line of the Erie canal is a physical impossibility, and if constructed it would be utterly impossible to supply it with water beyond the point to which it could be fed from Lake Erie, and therefore the question as far as the Erie canal is concerned simply resolves itself into the deepening the existing canal within its present limits and the lengthening and deepening the locks. By this means boats of probably double the present capacity, perhaps even of 500 tons burden may be enabled to traverse it. With this relief and the strong hope that the introduction of steam applied to the boats, may secure greater rapidity of transit, the Erie will have attained the acme of its capacity, and its case as a candidate for conversion into a ship canal may be dismissed without any fear or imputation of injustice being done its claims.

The same things are true of the Oswego route—it is impossible to construct it of a capacity to pass boats of 500 tons burden and all the engineering reports have been made on this basis, as I believe, but conceding to any possible canal, so constructed, a capacity for 500 tons or even 600 tons, and you still have only a large canal, requiring transshipment from the large lake craft, and entirely unavoidable, unfitted and inadequate for the passage of large boats and cargoes. The enlargement of the canal to this size would be enormously expensive, and to the size of a ship canal, if that were physically possible, would be utterly impracticable from the enormity of its cost. The length of canal, 202 miles, with the low rate of speed practicable, also really and practically takes this route out of the category, and this same objection applies with still greater force of course to the Erie.

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While engineers have certified to the sufficiency of water for the Oswego enlarged to a capacity for boats of 400 tons, it has nowhere been shown that there is a capacity for a ship canal of dimensions sufficient to pass vessels of 1,000, 1,200 or 1,500 tons which the Champlain ship canal would be constructed to do, and there is hardly a doubt that lack of supply of water would be an insuperable obstacle to the construction of an Oswego ship canal as well as Erie ship canal. But that it would be sound policy for the state to enlarge to the utmost extent all the existing modes of transit and furnish all the facilities practicable, I am fully convinced and would therefore advocate them, for their construction and employment even to their full capacity would in no wise militate against the construction of the proposed ship canal from Lake Champlain to the Hudson, which I believe to be the crowning work of our great system of internal improvements, and the only possible solution of the great question of furnishing an outlet for the teeming granaries of the West, so capacious that it can never be over-taxed, so speedy and certain that it can never be surpassed by any other route.

The representations made by the zealous advocates of other routes, and in particular by those urging the Oswego route, are filled with inaccuracies which require to be rectified. The admission into the reports of the Senate Committee and other official documents gives them a currency and quasi official indorsement which requires their refutation. It is necessary to call attention to these matters before proceeding to make comparison of the merits of the various routes, in which comparison, while correcting the erroneous statements and perversions of fact, we shall take the distances, lockages, etc. from the statements of the Erie and Oswego routes.

The first misrepresentation is with regard to the length of canal to be traversed on the Caughnawaga route *from the west*, because the business to be transacted is from the west, and the addition of every mile of canal would add to the *time* and necessarily the *cost* of transit. Now, in transporting the products of the great West to market,

vessels of 1,000 tons leaving Duluth or Chicago pass through the great lakes and St. Lawrence River and arrive at the entrance to the proposed Caughnawaga Canal having only passed through thirty miles of canal (the Welland enlarged), instead of sixty-five and a half, as stated in Mr. McAlpine's report to Oswego Committee, and inserted at length in the Windom Senate Committee Report. The inaccuracy in this case consists in including thirty-five and a half miles of the St. Lawrence River canals, which boats *from the west* do not have to use, it being necessary to use them only on the *return* trip, owing to the force and rapidity of the current, and, therefore, these canals are wrongfully used as a factor in making up a statement of the time consumed in making a trip from the great lakes to New York. Admitting the correctness of the statement that vessels must pass through these canals, and still it will be demonstrated that the Caughnawaga route is the most favourable for rapidity of transit as well as excelling in all other respects all the other existing and proposed routes. The Richelieu River, above St. Johns, is a broad, deep river and just as free from let and hindrance in navigation as Lake Champlain itself.

Again, in the statements furnished by the advocates of the Oswego route, the number of locks on the Caughnawaga route is misstated. Instead of four locks the twenty-nine feet lift on Caughnawaga canal will only require two locks.

Again, on the proposed ship canal from the Hudson to Lake Champlain they state the lift from the lake to the river to be eighty-three feet eight inches, while in reality it is only twenty-eight feet, and, as proposed to be constructed, would only be thirty-nine feet, a lift which, in no event, would require over four locks, while they state the number at eight.

The object of these misrepresentations will appear obvious when it is stated that the time consumed in making lockages is counted as a mile of canal for each lock, and in this manner quite an unfair difference is made to appear to the disadvantage of the Caughnawaga route.

But with all these misstatements they can scarcely give an appearance of

advantage to their route, shorter, indeed, in the actual distance to be traversed, but immensely longer in the line of canal to be passed through.

There are other unfair statements which, in the course of remarks upon the tables of comparative distances, will receive attention, but the greatest inaccuracy, and the one most calculated to mislead, is the unfair assumption of an equal rate of speed being practicable on the two routes, and making comparisons and deducing results from this unwarranted assumption.

Now, for the existing canal, or for any canal that may be constructed on the Oswego route, it is very questionable whether a higher rate of speed than three miles an hour can be sustained without injury to the banks, while on the large water ways of the Caughnawaga route vessels can, without difficulty, maintain the same rate of speed as on the lakes and rivers, that is, nine miles an hour, but, for the purpose of comparison with existing routes, we shall call it six miles. The simple statement shows that much greater rapidity of transit is practicable on this route than by any other, and that as far as rapidity of transit is concerned the solution of the problem in this respect is by the Champlain ship canal route.

A careful examination of the map of transportation routes from the Mississippi to the seaboard, which accompanies this report, will satisfy any candid and unprejudiced person that the natural route for a great water way is the Champlain ship canal, and that it is, moreover, the *only possible route*. Existing routes may be increased in capacity, but can never, by any possibility, do more than a small portion of this immense business, while the Champlain ship canal and Hudson River improvement, constructed upon a proper scale, will have a capacity sufficient not only to do all this immense business now offering, but for a business of immensely greater volume even, and with the other avenues provided would seem to make ample provision for many years in the future. Space forbids my entering in detail into a minute examination of the relative advantages of the various routes, but, as bearing on the

questions, I will quote the following from Hon. W. J. McAlpine's report to Montreal Harbor Commission, March 24, 1858: "That the determination of the question of the best route for the water borne trade is therefore reduced to a comparison between the routes through the State of New York and that along the St. Lawrence. With this view the cost of transport on the Erie and Oswego canals is taken as if they were (1858) enlarged throughout. The Caughnawaga canal from the St. Lawrence to Lake Champlain will be considered as completed on the same scale as the St. Lawrence canal, and the Champlain canal will be regarded as also enlarged to the same dimensions. The locks on the Welland and St. Lawrence canals will be considered as also enlarged."

"In comparing the routes through the state of New York with each other, and the St. Lawrence, it is necessary to observe that by the way of Buffalo and Oswego a *transshipment* must be made from the lake vessel to canal boats, and that the extra cost of canal transport and heavy tolls must be added to those rates, while by the way of Lake Champlain to New York and by the St. Lawrence no *transshipment* is required, and the cost of transport will be very much reduced.

"From the computations we have made it will be seen that the cost of transport to New York by the way of the St. Lawrence and proposed Caughnawaga canal, and enlarging Champlain canal for ordinary vessels, is less than by the way of Oswego.

"The Champlain route, thus improved, will have the further advantage of the more economic use of vessels of the largest class proceeding from any port in the States directly to New York without breaking bulk, and also the diminished length of canal navigation by that route."

In the report from which the above extract is taken, made in March, 1853, by W. J. McAlpine, J. P. Kirkwood and J. Child, an estimate is there made as to the comparative cost of transport via the Erie Canal route, the Oswego route and the Champlain, and the advantage shown to be largely in favour of the Champlain route.

In Mr. McAlpine's report to the Os-

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wego Board of Trade, submitted September 1, 1873, and supplemented by answers made by Mr. McAlpine to the Windom Senate Transportation Committee, there are many things requiring correction, to some of which we have already called attention, and the Hon. John Young, of Montreal, has done this so felicitously, that I quote from his reply to this report, published in the *New York Times*, November, 1873 :

"The Secretary of the Oswego Board of trade says : - In September last, in presenting Mr. McAlpine's report, that 'it is with much gratification I am enabled to state that Mr. McAlpine decides in favour of the Oswego water route, and shows most conclusively that a ton of freight, or bushel of grain, can be transported from Chicago via the enlarged Welland Canal, or the projected Niagara ship canal, Lake Ontario, the Oswego route via Oneida Lake, the improved Erie Canal from the Oneida Lake Junction to Troy or Albany, and the Hudson River to New York, much more cheaply and quickly than by the Erie Canal route via Buffalo, or the St. Lawrence and Lake Champlain routes were either of those routes improved to their best capacity.' "

Here the issue is fairly and squarely presented. Now as to the facts. Mr. McAlpine's statement is in reference to distance and lockage on the

OSWEGO ROUTE VIA ONEIDA LAKE.

	Miles.
Oswego Canal improvement.....	21
Canal thence to Oneida Lake.....	13½
Oneida Lake.....	23
Oneida Lake Canal.....	9
Erie Canal to Troy.....	128
Total.....	191½

Lockage

	Number of locks.	Feet of lockage
Oswego Canal.....	13	113
Canal to Oneida Lake.....	2	9
Oneida Lake Canal.....	7	60
Erie Canal to Troy.....	46	427
Total.....	68	609

THE CAUGHNAWAGA CANAL ROUTE.

	Miles.
From point in Lake Ontario opposite Oswego to St. Lawrence river at King-ton.....	22
St. Lawrence river navigation.....	134
St. Lawrence canal navigation.....	35½
Caughnawaga canal.....	34½
Richelieu river.....	23
Lake Champlain.....	111
Champlain ship-canal.....	25
Hudson river to Troy.....	40
Total.....	425

Lockage.

	Number of locks.	Feet of lockage.
St. Lawrence River canal.....	22	162
Caughnawaga canal.....	3	29
Champlain canal.....	8	83.8
Hudson River improvement.....	11	116
Total.....	44	391

showing by Mr. McAlpine a difference in distance in favour of the Oswego route of 233½ miles, and a difference in lockage in favour of the Champlain route of 218 feet. Taking each lock as equivalent to one mile of canal, the difference in distance is 209½ miles in favour of the Oswego route.

I presume the distance, locks and lockages, as given by Mr. McAlpine on the Oswego route are correct. I regret, however, that this is not the case on the St. Lawrence route. No one knows better than Mr. McAlpine that the large mail steamers of 600 tons, drawing 7 and 7½ feet of water, daily descend the St. Lawrence from the head of Lake Ontario, without using the St. Lawrence canals on the downward trip. He knows, also, that the Canadian government have had frequent surveys made of those parts of the river requiring improvement to give at lowest water on the descending trip twelve feet. Messrs. Maillefert and Rasloff estimated in their report the whole cost of this improvement, giving twelve feet water at \$720,000; and it is now part of the policy of the Canadian government to make the whole river from King-ton to Caughnawaga, or

* Incorrect. There are but two locks on Caughnawaga canal, and there will be but four locks up from Lake Champlain, and 128 feet lift, instead of 83.8, as erroneously given above. The length of Champlain Ship canal is 21 miles, not 25 as above stated.—A. B.

Lachine, navigable for vessels drawing twelve feet of water. It is only during two months of some seasons that the St. Lawrence falls to its utmost level. During the remainder of the season there is from fourteen to sixteen feet of water in the navigable channel. Instead, therefore, as Mr. McAlpine states, of there being forty-four locks on the St. Lawrence route, with 391 feet of lockage, there will only be twenty-two locks with 229 feet lockage on the downward trip. Taking Mr. McAlpine's views, that one lock is equal to one mile in distance, we have

OSWEGO ROUTE TO TROY.

	Distance. Miles.	No. of locks.	In dis- tance.
From Oswego....	191½	68	259½
Oswego via St. Lawrence and Champlain to Troy	425	22	447
Difference			187½
Instead of 259½ miles, as stated by Mr. McAlpine.			

Lockage.

	Lockage, feet.
By Mr. McAlpine's Oswego route to Troy.....	609
By St. Lawrence and Champlain route to Troy.....	229

Difference 380
instead of 218, as stated by Mr. McAlpine.

With regard to the speed of vessels on lakes and rivers, and time of transit by the various routes, Mr. Young, in continuance of his criticism on Mr. McAlpine's statement, proceeds:

"Let me now allude to the question of speed on the lakes and river navigation. Mr. McAlpine says, on page 9 of his report, 'that it will not be economical to exceed eight miles an hour on the lakes and six miles on rivers. In reply, I state, without fear of contradiction, that there are propellers now in the trade between Montreal and head of Lake Ontario and to Chicago, regularly running ten miles an hour, and I am aware of some that run eleven miles an hour. These vessels pass through the Welland Canal, and are about 400 tons burden. It is not, therefore, too much to say that such being the speed of those vessels, the speed of the 1,000 ton vessel, when the canals

are enlarged, will at least be equal. The St. Lawrence below Kingston is the only river to be traversed on the route to Troy, and the speed there will be equal to the speed on the lakes. I shall, therefore, take the speed at ten miles an hour, which a little inquiry on the part of Mr. McAlpine would have shown him to be correct. He says the speed on the enlarged canals will be four miles an hour, but prefers to take the speed at three and one-half miles, which I accept. Mr. McAlpine gives the following as the estimated time which will be occupied on the voyage via Caughnawaga to Troy:—

Miles.	Hours.
22 From point as stated to Kingston (lake).....	2.75
134 From Kingston to Caughnawaga (river).....	22.33
3½ From Kingston to Caughnawaga (canal).....	14.00
34½ From Caughnawaga to St. Johns (canal).....	9.04
23 From St. Johns to Rouse's Point (river).....	3.83
111 From Rouse's Point to Whitehall (lake).....	13.87
25 From Whitehall to Fort Edward (canal).....	9.00
40 From Fort Edward to Troy (river).....	9.41
425	84.59

or 3 52-100 days.

Mr. McAlpine says the time for passing each lock will be fifteen minutes. If this is added to the forty-four locks which he says are on the route—say eleven hours—the total time will be 95.59-100 hours.

In contrast with the statement I give the following as the true time, which no one who understands the route will contradict:—

	RATE.		
	Miles	Speed.	Time.
From point opposite Oswego to Kingston (lake).....	22	10	2.2
From Kingston to Caughnawaga (river).....	169½	10	17.0
From Caughnawaga to St. Johns (canal)...	34½	3½	9.4
From St. Johns to Whitehall (lake)...	134	10	13.4
From Whitehall to Fort Edward (canal)....	25	3½	9.0

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	RATE.		
	Miles.	Speed.	Time.
From Fort Edward to Troy (river).....	40	6	6.66
Total.....			57.66
Add fifteen minutes each for twenty-two locks.....			5.50

Total..... 63.16
or 63.16 100 hours against 95.59-100 difference of thirty-two and one-half hours.

Then on page 11 Mr. McAlpine gives a comparison of the time on the Oneida lake route:

	RATE.		
	Miles.	Speed.	Time.
From Oswego to Phoenix 21 ..			8.50
From Phoenix to Oswego (lake).....	13½		3.75
Through Oneida (lake) 23 ..			3.83
Through Oneida (lake canal).....	6		3.25
From Higginsville to Troy (canal).....	128		43.50

Total 62.83
or 2 83-100 days. The above figures should be as follows:

	RATE.		
	Miles.	Speed.	Time.
From Oswego to Phoenix (canal).....	21	3½	6.00
From Phoenix to Oneida (canal).....	13½	3½	3.86
Through Oneida (canal) 23 ..	10		2.30
Through Oneida (lake canal).....	6	3½	1.72
Higginsville to Troy (canal).....	128	3½	36.55
Sixty-eight locks at fifteen minutes each, ..			17.00

Total 67.43

As before explained, Mr. McAlpine's plan of transport from the upper lakes is to discharge the 1,000 ton vessel, carrying 50,000 bushels of wheat, at Chicago, into steam barges, at Oswego, of 500 tons, carrying 25,000 bushels, and with these go through the Oneida route to Troy and New York. Now, in Mr. McAlpine's calculation of the time of the voyage from Oswego to Troy, he makes no allowance for the time of transferring the 50,000 bushels from the upper lake vessel into the barges.

Taking 5,000 bushels per hour as a good average for an elevator, we have thus ten hours for the 50,000 bushels, and if we allow two hours more for berthing and mooring the ship, we have twelve hours, which, if added to the sixty-seven and forty-three one-hundredth hours as above, the time by the Oswego route would be eighty hours, against sixty-three and one-half hours by the Caughnawaga route, or a difference in favor of the latter of sixteen hours, whereas Mr. McAlpine erroneously, in his Oswego report, declares the difference in favor of the Oswego route to be twenty-one hours, contradicting his statement, when associated with Messrs. Kirkwood and Childe, that "by way of Oswego a transshipment must be made from the lake vessel to canal boats, and the extra cost of canal transport and toll must be added to that route, while by way of Lake Champlain to New York no transshipment is required, and the economy of time and of transport by the Lake Champlain route could not fail to attract a very large share of the trade between the Western States, New England and New York."

With reference to the cost of transport Mr. Young proceeds:

"I shall now examine Mr. McAlpine's estimate of the cost of transport by the two routes in question. Both are equal in reference to Oswego, for to that point from the upper lakes the 1,000 ton propeller is common to the two routes, and it is as to the merits of the route from Oswego to Troy, by canal, with a transshipment at Oswego, and the advantages of the route from Oswego, by the S. Lawrence and Champlain route to Troy, that are now in question. In the report of Messrs. McAlpine, Kirkwood and Childe, the cost of the transport was fixed at four mills per ton per mile, on large ship canals, and two mills on lakes. Mr. McAlpine, in his late report, after elaborate calculations, determines the cost of transport by the Oneida and Oswego canal at a little less than one and a half mills per ton on lakes, and three and a half mills on ship canals, the difference being, no doubt, in consequence of the enlarged character of the navigation and size of the vessel.

"FIRST, FROM CHICAGO TO TROY VIA ST. LAWRENCE AND LAKE CHAMPLAIN.

Lake Navigation.

Miles.

From Chicago to Kingston	1,077	
Lake Champlain	134	
Total	1,211 at 1½ mills,	\$1 32

River Navigation.

From Kingston to Caughnawaga, equal to lake...	169 at 1½ mills,	25
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Canal Navigation.

Welland	28	
Caughnawaga	34	
Champlain	25	
Total	87 at 3½ mills,	30
Hudson River improvement	40 at 2 mills,	8
Total cost per ton		\$2 45

"SECOND, FROM CHICAGO TO TROY VIA ONEIDA LAKE AND OSWEGO.

Miles.

Chicago to Oswego	1,077	
Oneida Lake	23	
Total	1,100 at 1½ mills,	\$1 65
Oswego to Troy :		
Oswego Canal	21	
Canal to Oneida Lake	13½	
Oneida Canal	6	
Erie Canal to Troy	128	
Total	169 at 2½ mills,	59
Add cost of trans-shipment		20
Twelve hours' detention, interest and insurance		20
Total		\$2 64

"Or, say a difference in favour of the Champlain route of twenty cents per ton. Yet Mr. McAlpine declares 'that comparing the cost, we find a difference of forty-seven cents per ton in favour of the Oneida Lake route, or seventeen per cent. less than by the Caughnawaga route.' Still this same gentleman with Messrs. Kirkwood and Child, declared in their report of 1858, that by taking the large lake vessel through to Whitehall 'the cost would be twenty cents

per ton less than by the way of Oswego. even if the Champlain canal should not be enlarged, so as to allow the large lake vessels to go direct to New York;' and again, when the St. Lawrence and Caughnawaga improvements are completed, it will be by far 'the cheapest mode of communication to New England and to New York.'

"It, perhaps, was not necessary to have gone into this question so minutely. The great fact is acknowledged by Mr. McAlpine and not contradicted by the Oswego Board of Trade, that it is impossible to take the lake vessel of 1,000 tons, carrying 50,000 bushels of grain, through from Oswego to Troy without breaking bulk, and without transferring her cargo into barges of 500 tons. It is also admitted by all that there is no difficulty whatever of taking this 1,000 ton vessel down the St. Lawrence and into Lake Champlain, to discharge her western cargo at Burlington, for Boston, or for distribution through out New England, or to go on to New York without transfer of cargo or breaking bulk. These are facts not disputed. I have shown that even if the cargo could be transferred at Oswego at the rate of 5,000 bushels per hour, there would be a detention of at least twelve hours, and that the Champlain route is the quickest and cheapest route, while the cost of the work necessary by the one is admitted to be over \$25,000,000, while the improvements of the Champlain canal from Whitehall to Troy have never been estimated at over \$6,000,000. The route by the St. Lawrence will be beneficial to the whole of the eastern states, as well as to New York, and places all these states not only in direct communication with the west and western Canada, but with the great timber regions of the Ottawa valley.

"The Oswego board of trade declare that the Oneida lake route has the advantage of 'two weeks' earlier navigation in the spring, and two weeks later in the fall,' while the facts prove that the St. Lawrence canal and Lake Champlain are open earlier and later than the Erie canal. Then again, we are to 'd' of 'the fogs of the St. Lawrence.' We have all heard of the fogs around Newfoundland and in the Gulf of the St. Lawrence, but it is quite new to

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learn of the fogs on the St. Lawrence above Montreal. Again, the Oswego board say 'it is the oldest route.' This is also an error, for I have before me a statement showing that Major-General Allen, of Vermont, applied to Gen. Haldimand, governor of Quebec, in 1784 for a licence to open up 'a navigable ship canal from Lake Champlain to the River St. Lawrence by the way of the Surrall river.'

"The whole subject seems to me of such great importance to both countries that I have been anxious that the facts as to both routes should be fairly stated. I have shown that Mr. McAlpine's statement, of there being 165 miles canal navigation below Oswego on the Champlain route—is an error, and that when the St. Lawrence is improved, the canals on that river on the downward voyage will not be used. The first canal is the Caughnawaga, of thirty-four and a-half miles, from the St. Lawrence into Lake Champlain. The next is from Whitehall to Fort Edward, of twenty-five miles, or fifty-nine and a-half miles in all. The improvement of the Hudson to Troy, of forty miles, is more a river than a canal; but even taking it as a canal, we have thus ninety-nine and a-half miles ship canal on the St. Lawrence route, instead of 165, as stated by Mr. McAlpine, with 609 feet lockage, via the Oswego route, against 229 feet lockage via Lake Champlain. The St. Lawrence river, below Kingston, has all the equivalents of lake navigation, both as regards speed and freedom. But an objection is urged that the Washington treaty, although it gives the United States the right to use the St. Lawrence, yet it does not protect or extend to the Caughnawaga canal,' and that 'the United States government cannot expend its money on foreign soil.' Now, Canadians do not desire the United States government to spend money in Canada; on the contrary, I think they are anxious to have such a good understanding between their kindred people in the United States as to create a feeling of entire confidence with each other in choosing and using any route of transport, either by canal or railway, no matter whether a part of such route be in the territory of the United States or in Canada, when the result of such

route will be to lessen the cost of transport from any one point to another. It is of the very highest importance, in the interest of both countries to cherish and promote the most liberal principle of trade between each, and having some experience of the feeling in Canada, I am sure everything will be done to insure and guarantee every reciprocal advantage that may be demanded in the way of transport.

"The late J. B. Mills, a civil engineer, of the United States, of great eminence and experience, declared in 1870, 'that is a truth beyond all controversy, that the people of the Dominion of Canada have, by the formation of the country, greater natural facilities for presenting, even for the city of New York, the best line for the carrying of the northern and north-western states, and we of the state of New York have to act only a little in concert with them to derive the full advantage of these at a very small cost, considering the favorable and inevitable results.' 'The distance from the westerly end of the Welland canal to Troy is, via the St. Lawrence and Champlain route, 590 miles, of which 500 miles will be free and uninterrupted lake and river down-stream navigation, and ninety miles, on the down voyage, is canal. I arrive at the conclusion that it will take four days and thirteen hours to carry a ton of freight from Lake Erie to Troy, or tide-water.' Again, 'the St. Lawrence line is open from twelve to eighteen days longer than the Erie canal, and we can carry a ton of freight at one dollar and ninety-five cents less than by the Erie canal.' Mr. Mills says further, 'it is said we are to have a ship-canal from Oswego to tide-water. Such a work will be about 200 miles long, which possibly may be had for \$25,000,000, but in the name of common sense and judgment, why spend that when you can get a better line, one of greater capacity, of quicker transit, for one-fourth the sum, which will be returned to the treasury of the state in tolls in about four years.' It is satisfactory that this opinion was also approved of by Walter Shanly, Esq., the eminent civil engineer and contractor for the Hoosac tunnel, who, in writing to Mr. Mills, declared that, 'I am satisfied that the only solution of the problem of how

the water communication between Lake Erie and the Atlantic can be made to keep pace in capacity with the growing trade of the West, and of New York, is to be found in the way so clearly pointed out by you.

"It is also satisfactory that Mr. Mc Alpine, in 1858, with his colleagues, Messrs. Kirkwood and Childe, expressed a similar opinion by declaring that 'the economy and time of transport by the Lake Champlain route could not fail to attract a very large share of western states, New England and New York trade,' and 'when the route of the St. Lawrence is improved it will present the cheapest mode of communication, not only to the seaboard, but also to New York and New England.'"

The advocates of the Oswego routes claim that the necessity which exists for transhipment at that place is a positive advantage, inasmuch as it prevents injury to the grain by heating. Now, on natural water ways, no one ever heard of grain being damaged in this manner, and all the testimony taken before the Senate Committee in relation to the transportation of grain 1,200 and 1,500 miles down the Mississippi to the Gulf of Mexico, under a tropical or almost tropical sun, shows that there was no difficulty of this kind. On the cooler water ways of the great lakes and rivers, of course there is less reason to apprehend this danger, which in fact does not exist, but in the heated waters of canals it is a thing constantly occurring, and is a real and solid objection against long reaches of canals of less capacity than the broad water channels of the Champlain route.

I have thus briefly adverted to some of the leading features of the proposed improvement, and met and answered some of the objections urged against it, and corrected some of the mis-statements with regard to it, and I will now for a moment consider the question of its costs.

We have an estimate in detail very carefully prepared by Mr. McElroy in his report of 1867 for a canal and river improvement for a canal, the prism of which should be the same as the Erie, except that its depth would be 8 feet, and the locks would be 225 by 25, and river improvement 200 feet wide

by 8 feet deep, all the structures, etc. to be constructed of stone in the most substantial manner, and the cost was estimated at \$4,500,000. Now, labour and materials were both higher in 1867 than they are to-day, and I am satisfied both from my own long experience in the construction of public works, and in the management of canals, and also from consultation with experienced engineers, that to make the proposed ship canal of the enlarged capacity with 12 feet of water and locks 30 by 45, which of course renders necessary the deepening of the river channel from 8 feet to 12 feet, would not increase the estimate of Mr. McElroy more than \$3,000,000, and that the total cost of this magnificent work would not exceed \$7,500,000. But if the cost be assumed at \$10,000,000, this must be regarded as a trifling and insignificant sum when considered either in comparison with any other proposed route, or in view of the immense beneficent results to the people of this state and also the great west. And it must ever be borne in mind while making this comparison, that the competing routes, while costing more than four-fold more at the least estimate, would not accommodate vessels of *one third* the capacity of those traversing this route, and which could only partially relieve, at the best, the pressing need of greater transportation facilities, while the Champlain route would furnish a capacity sufficient to bear the whole product of the west, and more, for, practically, its capacity is almost limitless.

Since the above was written I have received the report which immediately follows, from Mr. G. T. Hall, the engineer, who has been employed in making survey of proposed ship canal. As it gives a full description of the canal from Whitehall to Fort Edward, its size, locks, feed of water, etc., together with a careful estimate of cost in detail, I commend it to the careful perusal of all who take any interest in this matter:

WHITEHALL, N. Y., Dec. 18, 1874.

HON. ALEXANDER BARKLEY, Canal Commissioner:

SIR,—In accordance with your request, I have the honor to submit the following report and map of the preliminary survey for a ship canal from

Lake Champlain
Hudson

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Lake Champlain at Whitehall to the Hudson river at Fort Edward.

SURVEY.

On the 24th August I received instructions from S. E. Babcock, Esq., resident engineer, to proceed to make at my earliest convenience, a preliminary survey for a ship canal and map thereof, from Whitehall to Fort Edward. The engineer corps at this place was at once organized for that purpose, in connection with our regular duties attending the Champlain canal enlargement, and actual field work was begun September 1st. The transit line of the survey was assumed as the centre line of the proposed ship canal, and was begun at a point in mid stream of Wood creek at right angles to the lower mitre-sill of the lowest of the combined locks at Whitehall. The object gained thereby, is to utilize and follow, as nearly as practicable, the channel of Wood creek, reducing the elevation of the Whitehall level 13 feet from the present elevation of the "five-mile level" of the Champlain canal, necessitating the construction of but one lock, with a lift of 15 feet, in the place of three combined locks, now in use, with a total liftage of 28 feet. The general direction of the line of survey was through the lowest line of the valleys of Wood and Little Wood creeks. Cross-sections have been taken at all points of rock excavation, and in earth excavation, whenever the unevenness of the surface demanded it. The line was run by angles and is 24 19 100 miles in length.

CHARACTER OF MATERIAL.

	Miles.
There are of rock excavation.....	1.65
There are of stiff clay	19.15
There are of silt overlaying clay and sand.....	3.39

PRISM.

The prism which is estimated for, contemplates 13 feet of water, and will be almost a thorough cut. The bottom width is 100 feet, slopes two horizontal to one vertical. A towing-path and berms 15 feet wide will be left on either side.

LOCKS.

The plan contemplates the building of four locks of 270 feet length between

quoins and 45 feet width at level of lower reach. They are distributed as follows:—One of 15 feet lift, with dam 125 feet long and 15 feet above Lake Champlain at Whitehall; one of 12 feet lift about 2½ miles south of Whitehall; one of 12 feet lift in the vicinity of the "old wooden lock," and one of 17 feet lift down to the river at Fort Edward.

WATER SUPPLY.

The daily water supply for leakage, lockage, evaporation and filtration is based on an estimate of 100 lockages each way per day, and will be 57,119,975 cubic feet, or 12,556,354,680 cubic feet for 220 days. The extra supply from the lakes at the head of the Raquette basin will be, according to Prof. Benedict, 13,329,360,000 cubic feet, so there will be an abundant supply of water. I have also taken careful gauges of East and Wood creeks, and, notwithstanding the extreme low water at the time, a daily supply of 12,000,000 cubic feet is assured, all of which can be made available.

ESTIMATE.

Rock excavation, 280,000 cubic yards, \$1.50	\$420,000
Earth excavation, 5,500,000 cubic yards, 30c	1,650,000
Four locks complete, \$150,000	600,000
Right-of-way	120,000
Sixteen swing highway bridges, \$14,204	227,264
Two swing railroad bridges, \$18,524	37,048
Wood creek dam	3,849
Engineering	396,816
Total	\$3,344,977

Respectfully submitted,
G. THOMAS HALL,
Assistant Engineer.

It will be seen that Mr. Hall estimates the cost of the ship canal at \$3,374,977. The estimate of the United States engineers, I am informed, is for the canal proper \$2,700,000, and for the Hudson River improvement, \$7,300,000, making a grand total of \$11,000,000, which, I am confident, will cover every possible contingency, and which, as I have before intimated, is, I believe in excess of what the work would cost properly and economically expended particularly as two of the existing Hudson river dams

are sufficient and those the most expensive on the line.

If the State should not abandon her policy of making the canals self-supporting by the abolition of all tolls on the commerce of the canals, or by so low a rate of tolls as only to keep them in repair, I am satisfied that a very brief term of years would see every dollar expended from this great improvement returned to its treasury.

But I have not dwelt upon this consideration, for it is of such vital importance, in my judgment, to the future weal of this State, its continued prosperity and its retention of its leading position in the nation, that I believe its construction is demanded, were there never a dollar of the outlay to be so returned, for it would be returned a hundred fold in the immense benefits which would flow from it to the whole people of the State when once in active operation and bearing on its bosom the cereal product of the great world granary, the west and north-west.

An argument used by some of its opponents is, that when freight on this route was so near Montreal, it would never continue on its route to Montreal, is about as sensible as the Montreal opposition to the Caughnawaga canal, on the ground that it will divert from Montreal traffic that would otherwise go there, and which Mr. Shanly disposes of very summarily by stating that Montreal cannot lose what she never had, and in this case we need feel no alarm that products will stop short of their market, the great money centre, unless we are so foolish as to fail to provide the necessary facilities for their transit, in which case only need we fear an improper diversion of our own trade.

I had intended to have submitted herewith some tables showing the receipts of grain at Buffalo, Oswego and Montreal for the past few years, but am unable to obtain as full and accurate statistics for the season just closed as I could have desired, and am, therefore, unable to present the subject in the full detail I wished, and must, therefore, leave this branch of the subject, with reference to the comparative statement of receipts at the various ports, contained in the extract from the Buffalo Board of Trade Memorial on page 170. Owing to the low prices and stagnation

of business there seems to have been a falling off in the receipts at each of the ports named, and about in proportion to the amount received in 1873. Calculations based on the statistics of 1873 and a term of years preceeding, would seem to show a large and marked increase in the receipts at Montreal, and a large relative gain there, which would indicate a serious diversion of the trade legitimately belonging to us, and which sound policy would require us to check, if in our power. The statement is well calculated to alarm those who know that the diversion of this traffic and its accompanying benefits will be fatal to the prosperity of the state.

Impressed with a sense of the grave importance of this subject to the people of this state, and of the necessity of prompt, vigorous and decided action in the premises, I have written earnestly on this subject, and I trust the legislature may take such action in the matter as will not only secure in perpetuity to the Empire State her leading position in the nation, but also afford to the great west the outlet for their produce, which is the only clog and obstacle in the way of their development to the fullest extent of their wonderful resources.

"The opening of the Caughnawaga route would not only afford cheap water transport, but also the reduction in rates of said transport which such competition would induce.

The Senate committee on transportation routes were most favorably impressed with this route, as all must be who have personally examined it, as the following extract from their report will show:

"The committee also express the hope that the state of New York will recognize the expediency of constructing this line by the way of the Champlain canal and the Hudson river to the city of New York, or in the event of the state declining to enter upon the work, that the United States Government shall give the subject that attention to which its manifest merits entitle it."

A survey has been made, and a full and exhaustive report on this route, as well as the Oswego and Erie canals, are now being prepared by U. S. engineers, under the direction of Col. Wilson, U. S. engineer corps, for which we may

look with interest, and with confidence that the judgment of experienced and trained engineers will show that the Champlain is the *only* practicable route for a *ship* canal or any canal of sufficient capacity to meet the requirements of the case.

I have written upon this subject solely with reference to its forming a link in the great water route to the west, and have not the space to allude, as I could wish, to the part it would play in the development of the inexhaustible mineral resources of the counties bordering on Lake Champlain, but in passing I will simply point to a great advantage which this route possesses over any other, which is, that an immense amount of return freights could be secured for vessels which, on any other route, must go back entirely empty or in ballast. The iron ore, slate and marble of northern New York and Vermont which are now shipped west at great trouble and expense, would furnish so large an amount of return freights as to seriously

reduce the rate of freights bound to tide waters. The prosperity of any country, according to the best authorities in political economy, is mainly based upon deposits of coal and iron, and the proper development of this region alone in the vast addition to the material wealth of the state, would justify the construction of this great work, as merely a state work, without reference to its national character.

It is impossible, within the limits at my disposal to more than touch upon the important issues involved, and I therefore dismiss the subject commending its careful consideration to all interested in the present and future prosperity of our state, believing it to be the subject of the most surpassing and paramount importance now before the people.

Respectfully submitted,
ALEXANDER BARKLEY,
Canal Commissioner.

Albany, March, 1875.